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Claims

[c1] 1.A data transmission element for downhole components, comprising:
a generally U-shaped annular housing having an inner wall undercut proximate its open end;
a generally U-shaped MCEI element comprising an inner wall, an outer wall; and an open end, an outer wall recess proximate the open end and an inner wall protrusion defining the open end;
the MCEI element being disposed within the annular housing such that the inner wall of the annular housing and the outer wall of the MCEI element form a gap and the recess is generally opposite the undercut forming a pocket wider than the gap there between;
an insulated conductor being disposed within the MCEI element;
wherein the gap, the pocket, and the MCEI element are filled with a polymer such that the polymer affixes the MCEI element within the generally U-shaped annular housing and the insulated conductor within the MCEI element.

[c2] 2.The data transmission element of claim 1, wherein the

polymer is a thermoplastic material.

[c3] 3.The data transmission element of claim 2, wherein the thermoplastic material is a fluoropolymer.

[c4] 4.The data transmission element of claim 3, wherein the fluropolymer is Teflon®.

[c5] 5.The data transmission element of claim 4 wherein the Teflon® material is chosen from the group consisting of PFA, FEP, ETFE, AF, PTFE, and ECTFE.

[c6] 6.The data transmission element of claim 1 wherein the polymer bonds to the annular housing.

[c7] 7.The data transmission element of claim 1, wherein the polymer bonds to the insulated conductor.

[c8] 8.The data transmission element of claim 1, wherein the polymer does not bond to the MCEI element.

[c9] 9.The data transmission element of claim 1 wherein the insulated conductor has a diameter that is larger than the open end of the MCEI element.

[c10] 10.The data transmission element of claim 1 wherein the conductor material of the insulated conductor is selected from the group consisting of copper, copper clad steel, silver plated copper clad steel, nickel plated copper clad

steel, copper clad stainless steel, silver plated copper clad stainless steel, and nickel plated copper clad stainless steel.

[c11] 11.The data transmission element of claim 1 wherein the insulating material of the insulated conductor is bonded to the conductor.

[c12] 12.The data transmission element of claim 1 wherein the insulating material of the insulated conductor is a polymer.

[c13] 13.The data transmission element of claim 12 wherein the polymer is a thermoplastic material.

[c14] 14The data transmission element of claim 13, wherein the thermoplastic material is a fluoropolymer.

[c15] 15.The data transmission element of claim 14 wherein the fluoropolymer material is Teflon®.

[c16] 16.The data transmission element of claim 15 wherein the Teflon® is chosen from the group consisting of PFA, FEP, ETFE, AF, PTFE, and ECTFE.

[c17] 17.The data transmission element of claim 1 wherein the MCEI element is segmented.

[c18] 18.The data transmission element of claim 1 wherein the

MCEI element has a plurality of outer wall recesses.

[c19] 19.The data transmission element of claim 18 wherein the plurality of outer wall recesses form barbs.

[c20] 20.The data transmission element of claim 1 wherein the MCEI element is constructed of ferrite.

[c21] 21.The data transmission element of claim 1 wherein the generally U-shaped annular housing is made of metal.

[c22] 22.The data transmission element of claim 21 wherein the metal is selected from the group consisting of steel, titanium, chrome, nickel, aluminum, iron, copper, tin, and lead.

[c23] 23.The data transmission element of claim 22 wherein the steel is selected from the group consisting of vis-count 44, D2, stainless steel, tool steel, and 4100 series steels.